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WILTRON

OPERATION AND MAINTENANCE MANUAL FOR MODEL 3114 VARIABLE LINE DISPLAY

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MODEL 3114

1-1. GENERAL DESCRIPTION

The WILTRON Model 3114 Variable Line Delay is designed to provide a continuously variable, precision delay line providing ideal response to X-Band frequencies. It maintains a 50 ohm impedance with low VSWR over the entire range of 60 cm variable length.

The WILTRON Model 3114 is calibrated in degrees per GHz and in tenths of millimeters over the 60 cm length. A knob with finger crank provides for rapid precise adjustment to any point on the scale. Input and Output connections are made through Type N female connectors.

2-1. APPLICATIONS

The Model 3114 Variable Line Delay is often used in phase comparator systems where the electrical length of a device under test must be exactly nulled out by a pure air line. In this application, the Model 3114 provides variable phase output, which is flat with frequency, and up to 60 cm variations can be added without the use of rigid air line. A vernier readout makes it possible to read the scale to 0.1° accuracy at 1 GHz.

3-1. SPECIFICATIONS

Total Line Length Variation	60 cm
Frequency Range	dc to 12.4 GHz
Scale Accuracy	±0.1 mm (equivalent to 0.1° at 1 GHz)
Input VSWR	Typically 1.25 dc to 2 GHz " 1.4 2 - 12.4 GHz " 1.5 8 - 12.4 GHz
Input Impedance	50 ohms, constant impedance with line length variation
Insertion Loss	Typically 1.5 dB at 2 GHz; " 3.0 dB at 12.4 GHz
Power Handling	10 Watts rms
Input and Output Connectors	Type N Female Stainless Steel
Physical Description	Shipping Weight: 30 lbs. Dimensions: 19" wide x 5 1/4" high x 12" deep One model suitable for bench use or rack mounting.

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3-4. PROCEDURE

Set up the Model 310B Phase Meter and the Model 311L 1.0 as instructed in Section 4-1, Phase Measurement Step-By-Step Procedure, of the 310B Manual.

(1) Apply a 1.0GHz CW signal from the Model 610B (using a Type 6110 plug-in) to the RF input of the Model 311L 1.0.

(2) Connect the Model 3114 INPUT to the TO TEST DEVICE connector and the OUTPUT to the FROM TEST DEVICE connector of the Model 311L 1.0 resolver.

(3) Set the vernier scale of the Model 3114 to 0 cm.

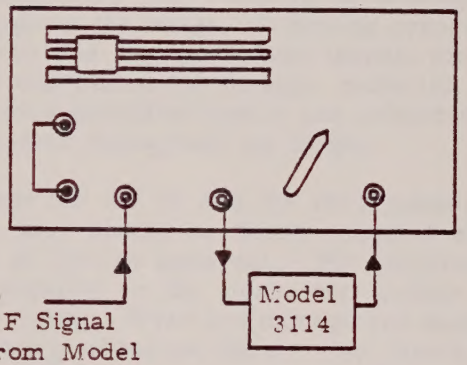
(4) Set the vernier scale of the Model 311L 1.0 to 0 cm.

(5) Adjust the Reference Phase Control so that the meter reads zero degrees on the most sensitive (2°) scale.

(6) A step-by-step comparison of the incremental accuracy of the Model 3114 can now be made by moving the vernier to successive tenths of a degree and reading the phase meter. They should agree within 0.1°.

(7) The overall accuracy may be measured by moving the resolver scale from zero to 10.0° on the scale and then setting the 3114 to the same number of its scale. As the resolver is moved from zero, the phase meter should move to a reading of 10°, and as the 3114 is set to a corresponding number, the phase meter should again read zero. (Use the 50° sensitivity range on the Model 310B.)

Model 311L 1.0
Resolver



Phase measurements may be conducted at frequencies other than 1 GHz using the same technique.

4-1. PERFORMANCE VERIFICATION

The Model 3114 Delay Line is a passive device and will normally require no routine maintenance. If mechanical damage is suspected, the integrity of the unit is best verified by a visual inspection.

The Model 3114 phase characteristics can also be measured using the test procedure outlined in Section 3-4.

4-2. VISUAL INSPECTION

Inspect the front panel scales to make sure they are free of foreign material and firmly fastened. With the vernier indicator at the extreme left position, check that all four scale zero positions are in alignment. Using the knob and finger crank, move the vernier indicator through the range of 0 to 60 cm and check to see that there is no binding throughout the range. If binding occurs, remove the top cover and inspect the rack and pinion for foreign material. The rack should be lightly and uniformly lubricated throughout its length.

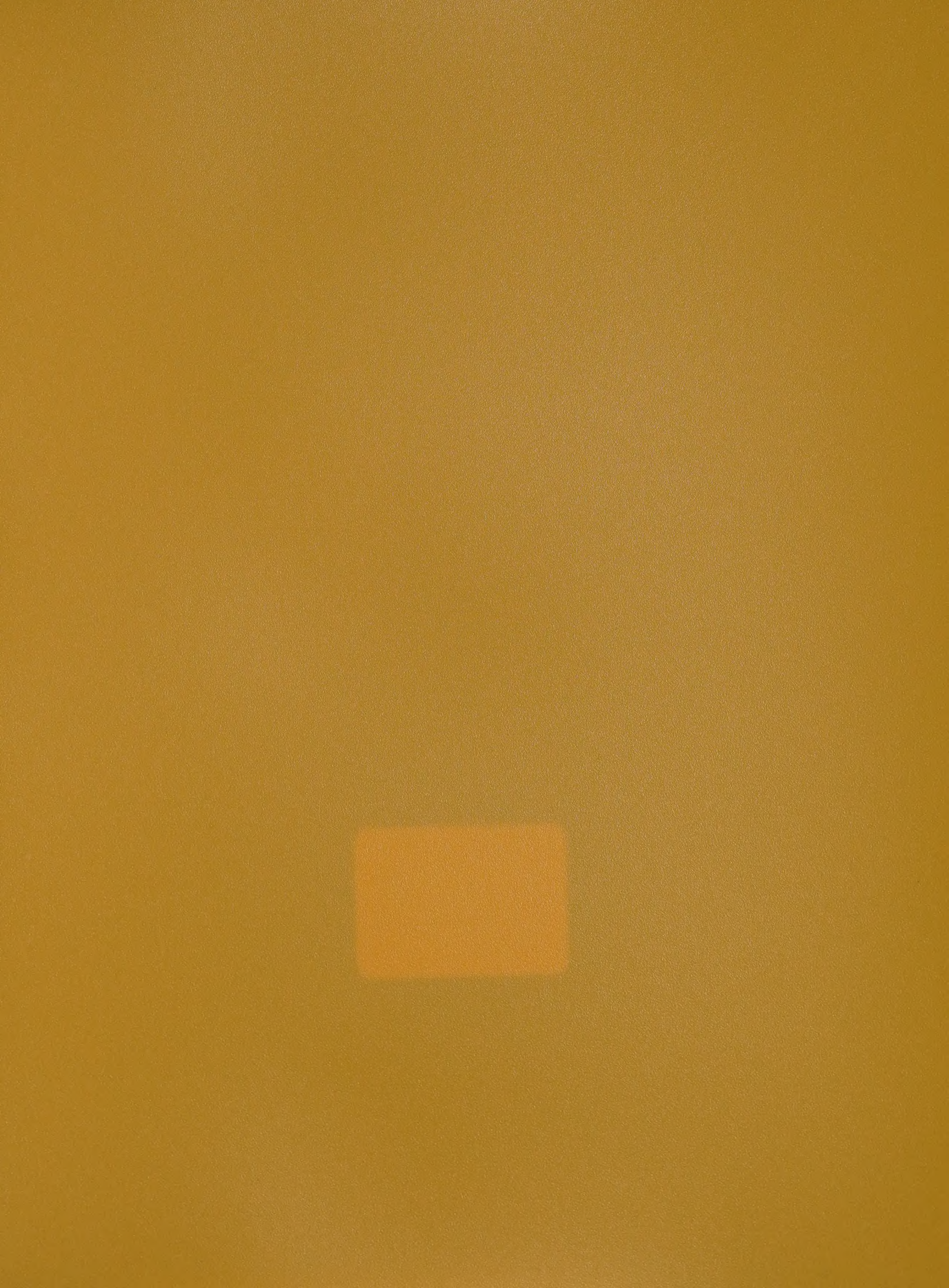
Inspect the RF IN and RF OUT connectors; they should be firmly mounted and free of foreign material. Pay particular attention to the connector center conductors. Wear and damage are most frequently observed here. No further disassembly is recommended. If any problems are found, contact your local WILTRON engineering representative.

4-3. TEST EQUIPMENT REQUIRED FOR CHECKING PERFORMANCE AND PHASE CHARACTERISTICS

COMMON NAME	MFG/MODEL NO	CHARACTERISTICS
Signal Generator	WILTRON 610B w/6110 plug-in	1.0 GHz 20 mW
Phase Meter	WILTRON 310B	0.1° resolution
Resolver	WILTRON 311L 1.0	0.1° scale at 1 GHz

Equipment other than that listed may be used provided it is equal to or better than the item designated.

Phase measurements are critical and require careful choice of connectors and coaxial cable. It is recommended that semi-rigid coaxial cable be used for these measurements.



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